

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-readable storage medium for use in a system that provides state-full access to a file and for implementing a method for accessing the file through a duplicate handle, the computer-readable medium comprising:

A computer readable medium having stored computer-executable instructions for performing the method, the method comprising:

receiving a request through a first channel to open a file residing on a server, the file having state information associated therewith;

in response to the request, sending a first handle to use to access data in the file and at least part of the state information associated therewith, the first handle having access rights to the file;

sending a resume key by which a duplicate handle may be requested, the duplicate handle having access rights to the file that correspond to the first handle;

receiving the resume key; ~~[[and]]~~

receiving a request through a second channel for a duplicate handle to the file;

sending the duplicate handle in response to the request for a duplicate handle; and
providing access to the file via the duplicate handle.

2. (Original) The computer-readable medium of claim 1, wherein the state information includes a mode in which the file is opened.

3. (Original) The computer-readable medium of claim 2, wherein the mode includes at least one of read only, read/write, a lock, and a mode in which the file is opened for exclusive use by the handle and any duplicates thereof.

4. (Original) The computer-readable medium of claim 3, wherein the lock comprises a range that indicates bytes of the file that can only be accessed by the first handle and any duplicates thereof.

5. (Original) The computer-readable medium of claim 1, further comprising authenticating a client that sends any request.

6. (Original) The computer-readable medium of claim 5, further comprising authenticating a server that sends any response.

7. (Canceled)

8. (Currently Amended) The computer-readable medium of ~~claim 7~~claim 1, wherein unencrypted information is sent over the first channel and encrypted information is sent over the second channel.

9. (Currently Amended) The computer-readable medium of ~~claim 7~~claim 1, wherein the channels pass through a single network interface on a single client.

10. (Currently Amended) The computer-readable medium of ~~claim 7~~claim 1, wherein the channels pass through at least two interfaces on a single client.

11. (Currently Amended) The computer-readable medium of claim 1~~[[7]]~~, wherein the first channel is disconnected and wherein the file remains open afterwards.

12. (Original) The computer-readable medium of claim 11, wherein the resume key is received after the first channel has become disconnected.

13. (Currently Amended) The computer-readable medium of ~~claim 7~~claim 1, wherein the first channel is disconnected and wherein the file remains open afterwards at least until another client requests access to the file.

14. (Original) The computer-readable medium of claim 13, wherein if the other client requests access to the file before a time has expired, the other client is denied access to the file.

15. (Original) The computer-readable medium of claim 13, wherein if the other client requests access to the file after the time has expired, the file is closed and the other client is granted access to the file.

16. (Original) The computer-readable medium of claim 15, wherein the client is informed that the file has been accessed by another client after the client sends the resume key with a request for a duplicate handle.

17. (Original) The computer-readable medium of claim 13, wherein after the resume key is received, the client is informed that the file has not been changed by another client.

18. (Original) The computer-readable medium of claim 1, wherein the request to open the file is sent from a first client and the duplicate handle is sent to a second client.

19. (Original) The computer-readable medium of claim 18, wherein the first client sends the duplicate handle to the second client.

20. (Original) The computer-readable medium of claim 18, wherein the second client receives the duplicate handle from a server that provides access to the file.

21. (Currently Amended) A computer-readable storage medium for use in a system that provides state-full access to a file and for implementing a method for accessing a file through a duplicate handle, the computer-readable medium comprising:

~~A computer-readable medium having stored~~ computer-executable instructions for performing the method, the method comprising:

sending a request through a first channel to open a file in a file access mode including data indicative of access rights, the file residing on a server;

receiving a first handle to use to access data in the file in accordance with the access rights, the first handle providing access to all or part of any state information associated with the file;

sending a resume key with a request for a duplicate handle through a second channel, the duplicate handle having access rights that correspond to the access rights of the first handle;

receiving the duplicate handle; and

accessing the file via the duplicate handle.

22. (Original) The computer-readable medium of claim 21, further comprising requesting the resume key.

23. (Original) The computer-readable medium of claim 21, wherein the resume key is automatically returned.

24. (Currently Amended) The computer-readable medium of claim 21, wherein the file is accessed via the first handle over the[[a]] first channel and the file is accessed via the duplicate handle over the[[a]] second channel.

25. (Original) The computer-readable medium of claim 24, wherein the second channel comprises a remote direct memory access (RDMA) channel in which data can be transferred from a client to a server without assistance from a central processing unit (CPU) on either the client or the server.

26. (Original) The computer-readable medium of claim 24, wherein the first channel is closed before the second channel is established.

27. (Original) The computer-readable medium of claim 26, wherein the file remains open after the first channel is closed.

28. (Original) The computer-readable medium of claim 21, wherein the file access mode comprises a mode of exclusive use by the handle and any duplicates thereof.

29. (Original) The computer-readable medium of claim 21, wherein the mode comprises an exclusive lock on a range of bytes in the file.

30. (Original) The computer-readable medium of claim 29, wherein the range of bytes is accessed via the duplicate handle.

31. (Currently Amended) A computer-readable storage medium for use in a system that provides state-full access to a file and for implementing a method for accessing the file through a duplicate handle, the computer-readable medium comprising:

A computer-readable medium having stored computer-executable instructions for performing the method, the method comprising:

opening a file in a mode comprising a set of one or more access rights and associating state information therewith;

obtaining a first handle to the file, the first handle capable of accessing the file in accordance with any access right included in the mode, the first handle obtained via a first channel;

obtaining a resume key with which to request a duplicate handle, the duplicate handle capable of accessing the file in any way in which the first handle is capable;

closing the first channel and keeping the file opened afterwards;

sending a request for the duplicate handle together with the resume key, the request being sent via a second channel; and

accessing the file via the duplicate handle.

32. (Original) The computer-readable medium of claim 31, wherein closing the first channel comprises a whole or partial network outage that disrupts the first channel.

33. (Original) The computer-readable medium of claim 31, wherein closing the first channel comprises rebooting a machine associated with the first channel.

34. (Original) The computer-readable medium of claim 33, wherein the machine comprises a client accessing the file via the first handle.

35. (Original) The computer-readable medium of claim 33, wherein the machine comprises a server providing access to the file.

36. (Currently Amended) A computer-readable medium having stored computer-executable instructions for use in a system that provides state-full access to a file and for implementing a method for accessing a file through a duplicate handle, the method comprising:
~~A computer-executable method for accessing to a file, comprising:~~

~~Obtaining~~using a network redirector to request a first handle to a file via a loopback path, the first handle capable of accessing the file in accordance with any rights granted while opening the file;

after requesting the first handle via the loopback path, requesting subsequent accesses to the file through a separate channel;

obtaining a resume key with which to request a duplicate handle, the duplicate handle capable of accessing the file in any way in which the first handle is capable; and

obtaining the duplicate handle to the file and thereafter performing any read or write access to the file via the duplicate handle.

37. (Original) The computer-readable medium of claim 36, wherein a client requests the handles and a server provides the handles and wherein the client and the server both reside on a single machine.

38. (Original) The computer-readable medium of claim 36, wherein the loopback path comprises a transmission control protocol/internet protocol (TCP/IP) stack.

39. (Original) The computer-readable medium of claim 36, wherein the resume key comprises a file identifier that identifies an open file, a time stamp, and a process identifier that identifies a process associated with the resume key.

40. (Original) The computer-readable medium of claim 39, wherein at least part of the resume key provides an index for other state information associated with the file.

41. (Currently Amended) A system for accessing a file through a duplicate handle, comprising:

a client configured to send a request through a first channel to open a file residing on a server, receive a first handle to the file and a resume key, send a request through a second channel for a duplicate handle together with the resume key, and access the file via the first and duplicate handles; and

a plurality of servers associated with a data store, only an active one of the plurality of servers controlling the data store at a time, the plurality of servers configured in a redundant relationship wherein when the active server goes offline another one of the plurality of servers becomes active and takes control of the data store, the data store comprising open files including the file and a data structure including resume keys to obtain duplicate handles for the open files,

wherein after the active server goes offline, the other server that becomes active is configured to build a data structure that is included on the other server and to place resume keys stored in the data store therein, so that the other server may provide a duplicate handle in response to a request for the duplicate handle from the client.

42. (Original) The system of claim 41, wherein the first handle and the duplicate handle provide identical access to the file.

43. (Currently Amended) A system for accessing a file through a duplicate handle, comprising:

a client configured to send a request through a first channel to open a file residing on a server, receive a first handle to the file and a resume key, send a request through a second channel for a duplicate handle together with the resume key, and access the file via the first and duplicate handles;

a plurality of data stores configured to operate in a distributed file system; and

a plurality of servers, each server associated with one of the data stores, each server including a data structure comprising resume keys to use in providing duplicate handles for the open files included on the data store associated with the server,

wherein when any of the servers is notified that it will be taken offline, the server is configured to send data including resume keys from its data structure to another server and to refer any requests for access to files associated with the sent data to the other server, the other server providing access to the file thereafter, the other server incorporating the data into the data structure included on the other server, so that the other server provides a duplicate handle in response to a request for the duplicate handle from the client.

44. (Original) The system of claim 43, wherein the first handle and the duplicate handle have the same access rights to the file.